

## LANDMINE DETECTION ROBOT

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### ABSTRACT

This paper presents the design of a robotic anti-personnel mine detection system aimed at improving the efficiency and safety of human mine operations. The robot integrates several sensors, including metal detectors and infrared imaging devices, to detect the presence of buried mines. An Arduino microcontroller is used to control the data from these sensors and provide real-time feedback to the operator. The autonomy and mobility of the robot is achieved by a combination of wheels and hinges, allowing it to navigate difficult terrain. This project holds great promise for humanitarian clearance efforts, as it is a cost-effective and reliable solution to reduce the risk of landmines by speeding up the clearance process. In this research, a mine detection robot prototype model is proposed. This robot can be operated remotely using wifi. [MR] magnetoresistive sensor for internal chemical signal detection.

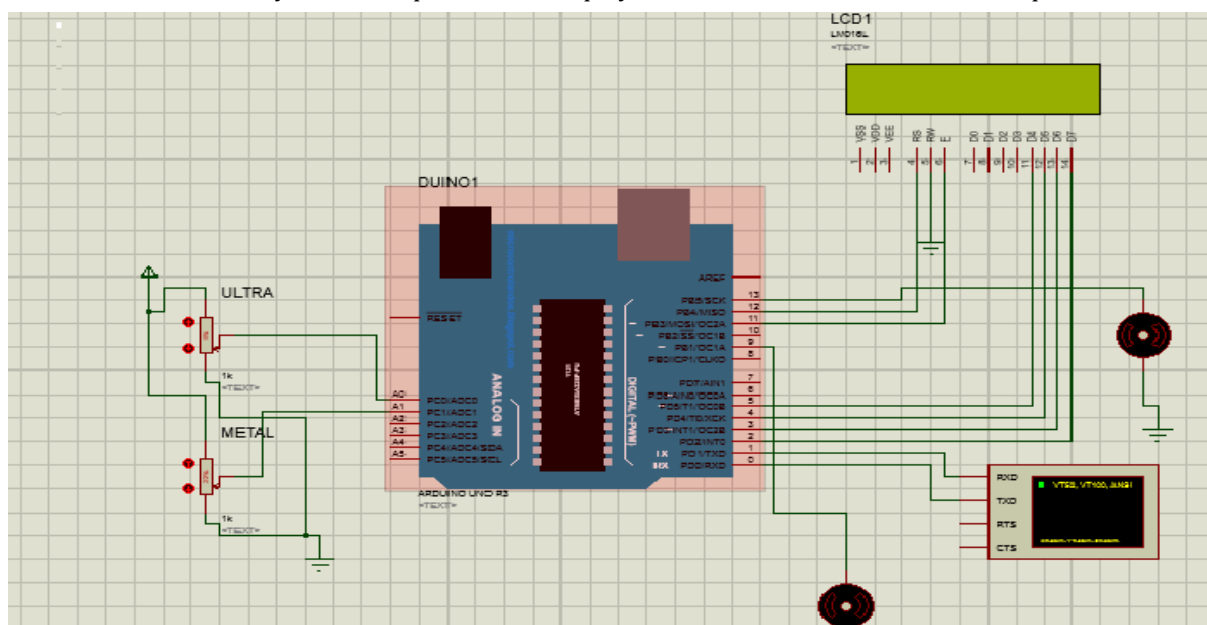
**Keywords:** Detectors, Arduino Microcontrollers [MR] Sensor.

### I. INTRODUCTION

Anti-personnel mine detection is the most important thing in the time of war, put the armored vehicle driver in enemy territory, the main purpose of our anti-personnel mine detection robot vehicle is to determine the maximum possible area for the defense area. If the mine explodes, it will harm the soldiers and release toxic pollutants into the environment. usually before the robots explode on the battlefield. Anti-personnel mines play an important role in saving soldiers' lives. Mines are explosive devices hidden under or in the ground and designed to destroy or disable enemy targets.

### II. METHODOLOGY

There are mainly two parts in this projects i.e. electronic part and mechanical part. In the electronic part the simulation of all electronic part like Arduino microcontroller, ultrasonic sensor etc. are done using the proteus software. the two planetary geared dc motor are connected to output pins (9,13) , of microcontroller board. The ultrasonic sensor is connected to the input pins (12,13). The metal detectors sensor are connected to input pins to detect the mines. The LCD display connection are connected to the output pins (2,3,4,5,11,13). For simulation, Arduino library have to import first to display and the sensors and motors are imported



**Figure 1:** Simulation of electronics part

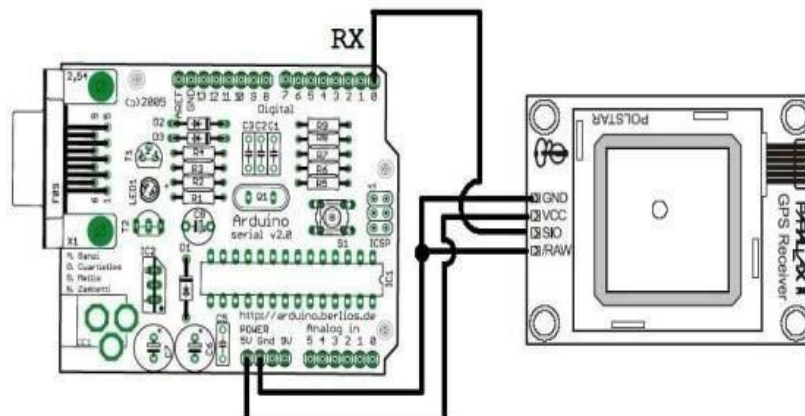


Figure 2: Simulation of gas

### III. MODELING AND ANALYSIS

Block diagram:

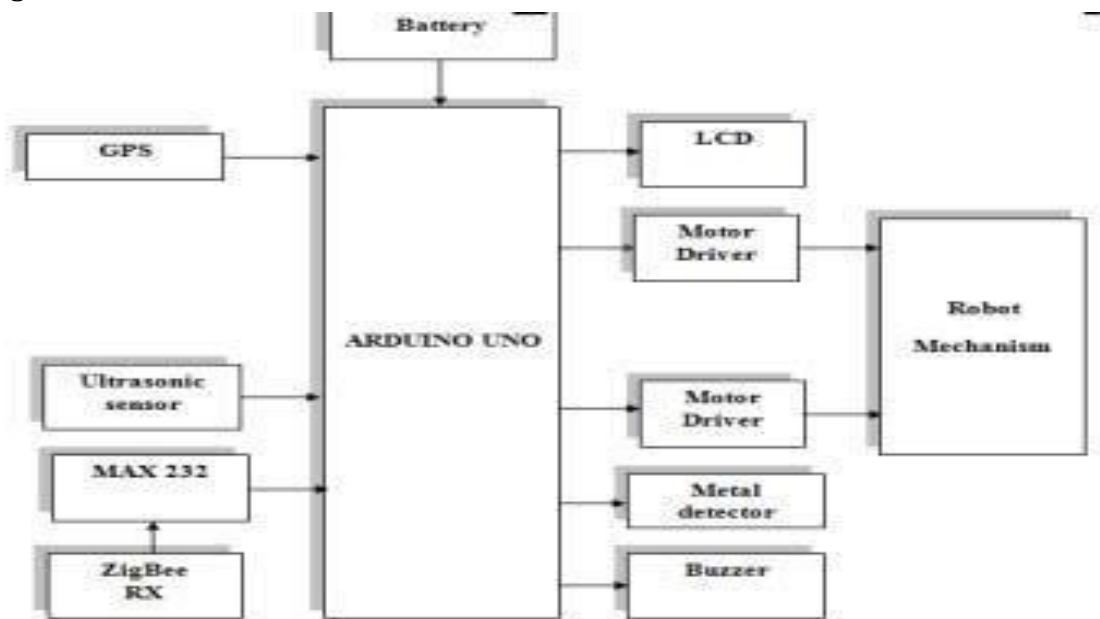


Figure 3: Transmission section of robot

#### Components

##### 1. Ultrasonic Sensor

Ultrasonic sensor is an electronic device which is used to calculate ultrasonic sound waves at a particular distance and converts these ultrasonic sound waves into the electrical signals.



Figure 4:

Ultrasonic sensors has transmitter and receiver. In these elements transmitter gives rise to sound generation and travels to the acceptor and target and back to the receiver.

## 2. GPS Sensor

Gps sensor stands for global positioning system. In this sensor mount chip processes signals from gps satellites using antenna .It helps in navigation. There are 31 well satellites that orbits the earth There are there basic components in gps sensor:

1. An Antenna
2. A reciever
3. A control / display unit



Figure 5:

## 3. Buzzer



Figure 6:

Buzzer gives a beep sound whenever metal detects the metal .It produces loud sound , beeping noise when it gets activated it needs audible signal .It consists of electromagnet , coil of wire and diaphragmIt creates magnetic field.

## 4. DC Motor

Concerts electrical energy to Mechanical energy .In dc motor , electrical energy is transformed in the form of mechanical movement and then to the rotational motion. It is used to move loads in the Big industries.



Figure 7:

## 5. Zigbee RX

Zigbee RX or we can say zigbeereceiver , its works as a special ear that listens for message in a wireless communication system called zigbee . In zigbee network device can communicate with other device . It uses radio waves to send message to another. Zigbee receiver picks and receives the right message and move on.We can also say that it works as a Walkie -Talkie.

## 6. Arduino Microcontroller

It is an Heart of the arduino board based on ATmega328P . It consist of 14 Digital input/output pins .It has 6 analogs , 16MHz ceramic resonator (CSTCE16MOV53-R), Power jack ,a USB connection .

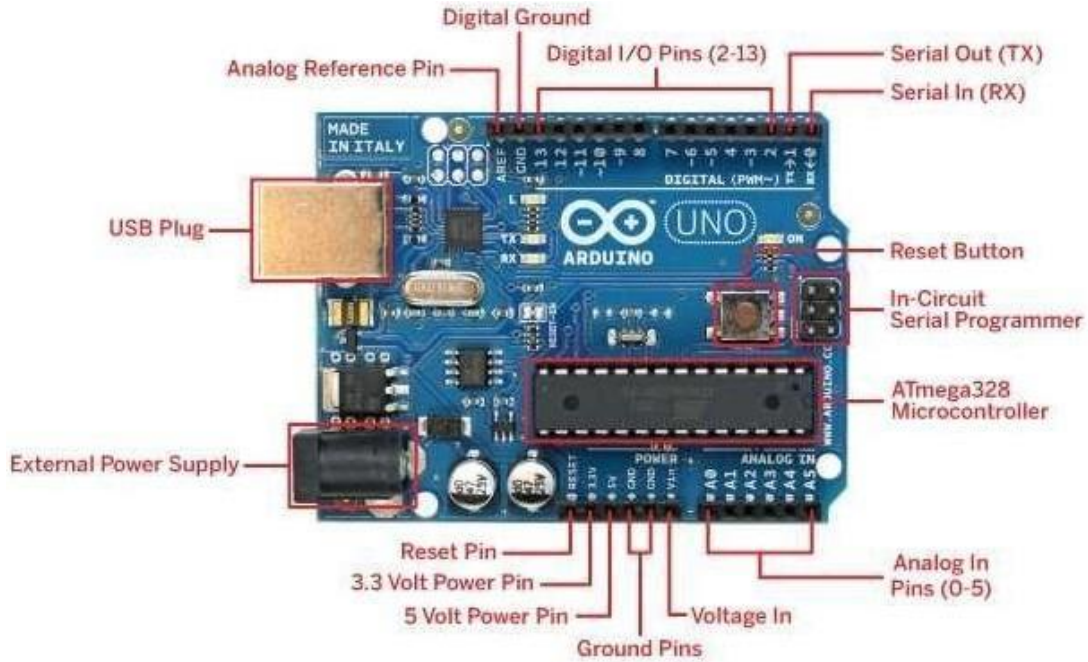


Figure 8:

#### IV. RESULTS AND DISCUSSION

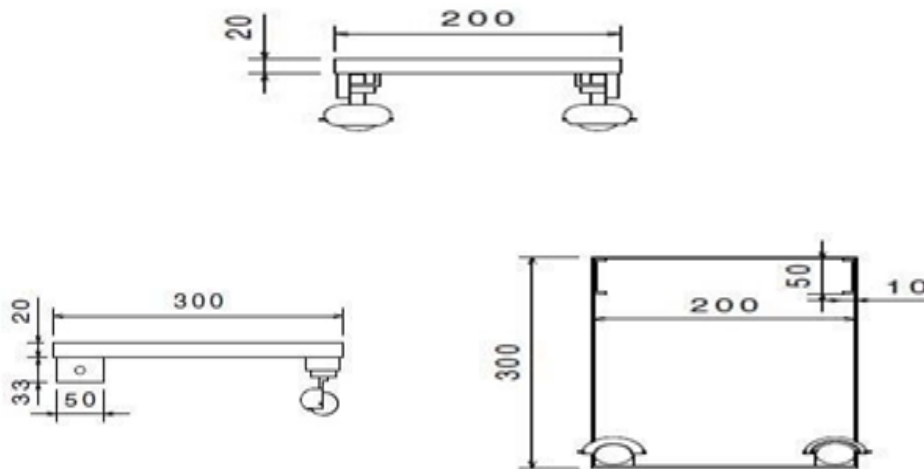


Figure 9: view of wheeled robot

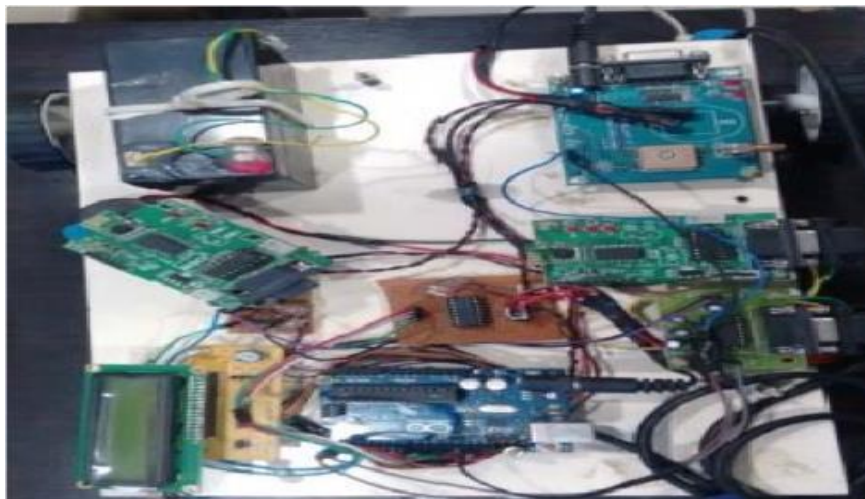
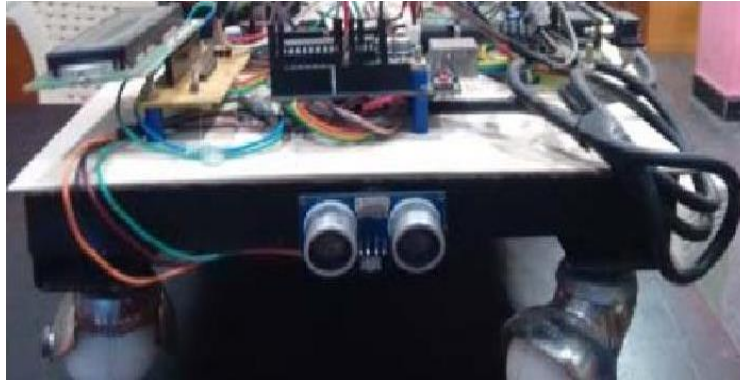


Figure 10: Top view



**Figure 11:** Front view

## V. CONCLUSION

This paper describes a general design for a wheeled robot for mine detection and execution. Wheeled robots for mine detection and handling. Wheeled robots are a cheaper, safer and more useful tool for the military for reconnaissance and surveillance purposes. Further limitations focus on improving body design by positioning the suspension system for impacts from uneven surfaces. The robot is equipped with a camera to monitor the position of the robot. The power system was developed by replacing the battery with solar panels to generate continuous power. The robot is equipped with a robot arm for diffusion purposes.

## ACKNOWLEDGEMENTS

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## VI. REFERENCES

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